

STANDARD FORM NO. 64

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TO : The Files

12 September 1958

FROM :

SUBJECT: AS-4A Engineering Tests - Phase 2

1. After analyzing the results of the AS-4A engineering tests conducted in May 1958 it was concluded that further testing would be necessary to prove the worth of the error correction circuits and the high speed page printer equipment. Long term reliable operation of the AS-4A itself and the KX-3 equipment also remained to be proven. Consequently, additional cross-country tests from Los Angeles to [ ] were conducted from 21 to 31 July 1958. Participating in these tests were:

2. In order to test the error correction circuits, interference was generated on one of the AS-4A channels by a 231-D transmitter at Station C. Tests were also made with the interfering frequency set between channels. In addition to the dual diversity antennas normally used, a doublet antenna beamed at [ ] was patched into one of the AS-4A receivers. When interference was desired, the three kilowatt transmitter at [ ] was keyed rapidly. With this arrangement a series of three tests were conducted a number of times at the AS-4A receive terminals. From the AS-4A transmit terminal a continuous RY pattern was transmitted. At the receive terminals, one minute of this transmission was copied with no interference. Next, one minute of RY was copied with interference injected using the error correction circuits. Finally, one minute of transmission was copied with interference being generated and with error correction switched out. As can be seen below, the effect of the error correction circuits was very significant.

## a. Interfering frequency set on channel 5

Error rate with no interferenceError rate using error correction circuits and with interferenceError rate with error correction switched out and with interference

0%

0.3

0.3

3.3

0%

1.6

0.61

3.0

32%

41.3

28.7

41.2

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B. Interfering frequency set between channel 3 and 5

<u>Error rate with no interference</u>	<u>Error rate using error correction circuits and with interference</u>	<u>Error rate with error correction switched out and with interference</u>
0%	6.0%	33.4%
0.23	0.2	41.0
0.3	2.33	38.0

During the test period, several time checks were made with the AS-4A system to see how long the equipment could run continuously. Periods of one hour, one and a quarter hour, and one and a half hours were recorded. These runs were made with the KX-3 equipment included. It was not necessary to monitor the manual sync control; operation was completely automatic. Tests were also conducted to determine the acceptability of the page printer. Modifications were made in the printer in early July to enable it to perform according to specifications. A switch has been installed to ignore line feed signals in one position or to recognize formatting signals in the other position. With line feed signals ignored, the printer accepted all traffic. Line spacing is determined by the format tape and photo diodes in the printer itself. Single, double, and triple spacing can be selected by a multi-position switch on the printer. All switch positions were tried successfully. With the line feed switch in the recognition position, specially formatted messages from the transmitter were printed satisfactorily by the page printer. Special formatting is accomplished by two line feed signals at the end of a line, followed by five spaces and two carriage return signals. This will produce double spacing at the printer. In order to get four spaces between lines, the special format signals must be inserted twice at the end of a line.

3. The tests conducted during this period proved that the error correction circuits were worthwhile. It was possible to operate the AS-4A system continuously and automatically for extended periods of time. Finally, it was shown that the printer operation was acceptable. A final test report will be issued in the near future combining the test results with a technical evaluation of the equipment.



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